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INTEL CORPORATION
c/o INTELLEVATE, LLC
P.O. BOX 52050
MINNEAPOLIS, MN 55402

| EXAMINER | |
|---|---|
| EJAZ, NAHEED | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/666,206 | BISWAS ET AL. | |
| | Examiner | Art Unit | |
| | Naheed Ejaz | 2611 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *16 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments filed on 05/16/2007 have been fully considered but they are not persuasive because of the following:

2. With respect to claims 1 & 20, Applicant argues, "Figs.2 and 4 describe the precoder of Fig.1 (see col.3, lines 5-61), which encodes data into constellation symbols for transmission. Thus, the cited Figs.2 and 4 do not concern a/the "received symbol" "(Remarks, dated:05/16/2007, (hereinafter, Remarks), page # 5, paragraph # 2). This is not persuasive since Figures 2 & 5 of Dagdeviren (6,798,851) (hereinafter, Dagdeviren) reference is teaching a/the "received symbol" since Dagdeviren teaches that the index mapping, which determines the constellation levels (positive, basic or negative) with respect to amplitude, is defined by table 30 (figure 2, col.4, lines 58-63, col.5, lines 48-63) and is utilized by decoder 110 (figure 5, col.4, lines 64-66). It is noted that the index mapping shown in table 30 is corresponding to the received signal (figure 6, element 123, col.11, lines 7-14) which reads on claim limitations of "determine a constellation index corresponding to the received symbol".

3. Applicant argues, "Examiner does not read the claimed mapper and coset selector on any particular element or elements of Dagdeviren" (Remarks, page # 5, paragraph # 3) and "Nor does Dagdeviren disclose that claimed "coset selector circuit" (Remarks, page # 5, paragraph # 5, line 4, page # 6, paragraph # 1, line 1). This is not persuasive since Dagdeviren is teaching constellation mapper (figure 7, element 138) and index mapping (figure 3 or figure 7, elements 134 & 136). Dagdeviren also teaches

that the table 30 which is equivalent to claim 'index mapper ' is used by decoder 110 (figures 2 & 5) table 30 values (claimed 'index mapper') are inputted to comparator 120 (claimed 'a coset selector to receive successive constellation indices from the index mapper') and comparator 120 compare the table 30 values with received signal 114 and generate an output signal identifying the index 31 closest to the received signal level 114 (col.10, lines 55-67, col.11, lines 1-5) which is equivalent to limitations of having 'a coset selector circuit to receive successive constellation indices from the index mapper and to determine a number of nearest cosets to the successive constellation indices' since index 31 is responsible to map the index with respect to amplitude associated with constellation levels (figure 2, col.10, lines 4-38) which is subdivided into two subsets of indexes {3,4} and {5,6} (claimed 'cosets') (col.10, lines 4-18) and identifying of index 31, which is associated with subsets (as described above) by the comparator 120, closest to the received signal (col.10, lines 55-58) is equivalent to identify the constellation indices (associated with index 31 of figure 2) closest to nearest subsets (claimed 'coset') .

4. Applicant argues, "no evidence has been presented that Dagdeviren discloses a constellation mapper that "determine[s] two constellation points that proximate the received symbol" (Remarks, page # 5, paragraph # 4) & "Dagdeviren does not, in fact, teach or suggest determining two constellation points that are proximate a received symbol" (Remarks, page # 6, paragraph # 4). This is not persuasive since Dagdeviren teaches in figure 6 constellation mapping and identifies if the received signal is in the 1$^{st}$, 2$^{nd}$ or 3$^{rd}$ constellation level and each level includes more than one constellation

point associated with amplitude (figures 2 & 6, col.11, lines 7-20) therefore, mapping of the received signal into the 1st - Nth distinct range includes identification of the received signal in the first, second or third constellation levels (figure 6, col.11, lines 21-41) reads on claim limitations of 'determine[s] two constellation points that are proximate the received symbol'.

5. Applicant argues, "there is no disclosure in Dagdeviren that this decoded symbol 112 includes "successive constellation indices from the index mapper" as also required by claim 1" (Remarks, page # 5, paragraph # 5). This is not persuasive since claim 1 does not recite the limitations the decoded symbol includes successive constellation indices (emphasis added). Additionally, Dagdeviren teaches that the mapper 116 of decoder 110 uses table 30 values which has maps index with respect to amplitude in order to determine constellation level (figure 2, col.10, lines 59-67, col.11, lines 1-6) therefore the decoded symbol 112 does include successive constellation indices from index mapper (figure 2 & 5, col.10, lines 59-67, col.11, lines 1-6).

6. With respect to claims 2 & 10, Applicant argues, "Wei fails to cure this deficiency, because it also fails to teach or suggest determining two constellation points, much less two that are nearest to a receives symbol" (Remarks, page 6, paragraph # 5). This is not persuasive since Wei does not only determine the distance between constellation points but it determines the minimum distance of signal points which inherently have more than one points as Applicant also agrees that "Wei only discloses determining a distance between constellation points" (Remarks, page # 6, paragraph # 5) and minimum distance between constellation points would also be applicable to the

minimum distance between two points. It should be noted that Wei teaches that the minimum distance criterion is a critical design parameter because the signal points are erroneously detected at the receiving modem depends on how far away the signal point is from its nearest neighbors in the PCM derived constellation (col.5, lines 24-32). In order to prevent the erroneous detection of signal points and provide higher rates with an equivalent level of performance Wei teaches an effective minimum distance between the constellation signal points (col.5, lines 34-44). Furthermore, Wei teaches Euclidian minimum distance in order to select the signal points of a constellation (col.5, lines 17-20 & 40-49) (claimed 'two constellation points are the nearest two points to the received symbol in a predetermined constellation of points")(It should also be noted that it is well known in the art that in order to assign a received signal to a constellation point from a given constellation, that constellation point is chosen which has the smallest Euclidian distance ("difference value") from the received point which was supported by Wei reference in the Office Action (dated: 02/08/2007, page # 6, paragraph # 17).

***Response to Amendment***

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 4, 6 & 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Dagdeviren (6,798,851).

9. As per claim 1, Dagdeviren teaches, 'A decoder, comprising: a constellation mapper circuit to determine two constellation points that are proximate a received symbol' (figures 2 & 5), 'an index mapper circuit to determine a constellation index corresponding to the received symbol based on the received symbol and the two constellation points that are proximate the received symbol' (figures 2 & 7). Furthermore, Dagdeviren decodes the signal which corresponds to index of received signal after mapping and associating index with the received signals (figure 7) and comparator 120 (figure 5) access table 30 (figure 5) to identify the amplitude level in the table closest to the receive signal and the index associated with the identified amplitude level in the table 30 can then be associated with the received signal (col.11, lines 58-65) & (figures 4 & 7, col.10, lines 59-67, col.11, lines 1-5) which is equivalent to the claim limitations of having 'a coset selector circuit to receive successive constellation indices from the index mapper and to determine a number of nearest cosets to the successive constellation indices' (see also paragraphs # 2-5 above).

10. As per claim 4, Dagdeviren determines the index that corresponds to the constellation points (figure 2) and which corresponds to the received symbol (figures 6 & 7, col.11, lines 42-67, col.12, lines 1-4).

11. As per claim 6, Dagdeviren discloses, 'combiners to generate at least one difference between the received symbol and at least one of the two constellation points that are proximate the received symbol (figure 1, element 22, col.4, lines 27-39),

wherein the index mapper circuit further determines the constellation index corresponding to the received symbol based on the at least one difference' (figure 1, col.4, lines 40-56).

12. Claims 20 & 21 are rejected under the same rationale as mentioned in the rejection of claim 1 above. It is noted that Dagderviren's constellation mapper is included in the decoder for the receiver circuitry of the modem and therefore, it can be implemented by a hard disk (figures 1 & 5, col.1, lines 11-14, col.3, lines 33-40).

***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. Claims 2, 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dagdeviren (6,798,851), as applied to claim 1 above, and further in view of Wei (5,953,376).

15. With respect to claim 2, Dagdeviren teaches all the limitations in the previous claim on which claim 2 depends but he fails to disclose the constellation points are the nearest two points to the receive symbol.

Wei discloses, 'the two constellation points are the nearest two points to the received symbol in a predetermined constellation of points' (col.5, lines 35-50, col.6, lines 13-54, col.13, lines 23-29).

It would have been obvious to one of the ordinary skill in the art, at the time invention was made, to implement the teachings of Wei into Dagdeviren in order to increase the data rate with high level of performance by increasing the effective minimum distance between the signal points of constellation and an average power constraint (received signal since power is associated with each signal) as taught by Wei (col.2, lines 60-65) thus enhance system performance.

16. Claim 10 is rejected under the same rationale as mentioned in the rejections of claims 2 & 6 above.

17. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dagdeviren (6,798,851) in view of Wei (5,953,376), as applied to claims 1 & 2 above, and further in view of Barabash et al. (5,640,417) (hereinafter, Barabash).

18. As per claim 3, Dagdeviren and Wei teach all the limitations in the previous claims on which claim 3 depends but they fail to disclose constellation points to be less than and greater than to the received symbol.

In the same field of endeavor, Barabash discloses, 'one of two constellation points is less than or equal to the received symbol and another of the two constellation points is greater than or equal to the received symbol' (figure 2B) & (figure 3, col.7, lines 56-61) (it is noted that circle radius is associated with the constellation points which are radially spaced (figure 2B) which reads on claim limitations of having two constellation points, moreover, Barabash sets the threshold in order to correctly detecting the symbol (col.7, lines 26-55) , the threshold consists of a circle having a radius greater than the magnitude of the innermost symbols but less than the magnitude of the outermost

symbols (col.7, lines 57-61) which reads on claim limitations of having two constellation points less than or equal to the received symbol and another of the two constellation points greater than or equal to the received symbol).

It would have been obvious to one of ordinary skill in the art, at the time invention was made, to implement the teachings of Barabash into Dagdeviren and Wei in order to correctly detect the received symbol by optimizing the decision radius of the circle where constellation points lie (col.7, lines 26-43) thus enhance the system reliability.

19. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dagdeviren (6,798,851), as applied to claim 1 above, and further in view of Yeh (6,112,266).

20. As per claim 5, Dagdeviren teaches two constellation indices that correspond to the two constellation points based on the received symbol (see claim 4 rejection above) but he fails to disclose interpolation of two constellation indices.

Yeh discloses constellation mapper (figure 2, element 242) that provides co-ordinates that include index 'j' in order to interpolate by shaping filter 244 (figure 2, col.5, lines 34-44) which reads on claim limitations of 'interpolate between the two constellation indices'.

It would have been obvious to one of the ordinary skill in the art, at the time invention was made, to implement the teachings of Yeh into Dagdeviren in order to create co-ordinate streams (claimed constellation points) which have narrow bandwidths as taught by Yeh (col.5, lines 36-47) in order to reduce the computational complexity with respect to constellation and thus increase system performance.

21. Claims 7 & 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dagdeviren (6,798,851), as applied to claim 1 above, and further in view of Forney (WO 98/32257).

22. Refer to claims 7 & 8, in addition to aforementioned rejection of claim 2 above, Dagdeviren teaches all the limitations in the previous claim on which claims 7 & 8 depend but he fails to disclose four or more nearest cosets to the successive constellation indices.

Forney discloses is reducing the constellation expansion by using 4D and nD trellis coding (page # 15, lines 17-28, page # 16, lines 1-5) which reads on claim limitations of 'coset selector circuit is arranged to determine about four or more nearest cosets to the successive constellation indices' & 'generate a sequence of trellis points based on the nearest cosets and one or more constellation indices corresponding to received symbols'.

It would have been obvious to one of ordinary skill in the art, at the time of invention, to implement the teachings of Forney into Dagdeviren in order to reduce the constellation expansion so that the needed amount of gain can be achieved as taught by Forney (page # 15, lines 15-20) thus enhance system performance.

23. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dagdeviren (6,798,851) in view of Forney (WO 98/32257), as applied to claims 1, 7 & 8 above, and further in view of Maurer et al. (6,418,170) (hereinafter, Maurer).

24. As per claim 9, Dagdeviren and Forney teach all the limitations in the previous claims on which claim 9 depends but they fail to disclose equivalence class index.

Maurer teaches, 'an equivalence class index mapper circuit to generate equivalence class indices from the sequence of trellis points (figure 1) & (figure 3, elements 30 & 32); and an inverse modulus encoder circuit connected to the equivalence class index mapper and arranged to generate data bits from the equivalence class indices' (figures 2 & 3, col.4, lines 12-45).

It would have been obvious to one of ordinary skill in the art, at the time of invention was made, to implement the teachings of Maurer into Dagdeviren and Forney in order to map the equivalence classes such that their identities are not lost during the phase reversal of the channel and thus prevent the communication channels from distorted transmission as taught by Maurer (see Abstract) and enhance system reliability.

25. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dagdeviren (6,798,851) in view of Wei (5,953,376), as applied to claims 1, 4 & 10 above, and further in view of Yeh (6,112,266).

26. Claim 11 is rejected under the same rationale as mentioned in the rejections of claims 4 & 5 above.

27. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dagdeviren (6,798,851) in view of Wei (5,953,376), as applied to claims 1 & 10 above, and further in view of Forney (WO 98/32257).

28. Claim 12 is rejected under the same rationale as mentioned in the rejection of claim 7 above.

29. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dagdeviren (6,798,851) in views of Wei (5,953,376) & Forney (WO 98/32257), as applied to claims 1, 10 & 12 above, and further in view of Barabash et al. (5,640,417) (hereinafter, Barabash).

30. As per claim 13, Dagdeviren, Wei & Forney teach all the limitations in the previous claims on which claim 13 depends but they fail to disclose scaling.

Barabash teaches, 'calculating a scale value based on the two constellation points' (figure 5, elements 50 & 60, col.8, lines 20-34), 'generating a sequence of points based on the at least four nearest cosets, the scale value, and constellation indices corresponding to received symbols' (see claim 8 rejection above).

It would have been obvious to one of ordinary skill in the art, at the time invention was made, to implement the teachings of Barabash into Dagdeviren, Wei & Forney in order to determine the symbol variance and set the circular threshold for constellation points and enable the system to detect the symbols correctly as taught by Barabash (col.7, lines 26-39) thus increase the system reliability.

31. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dagdeviren (6,798,851) in views of Wei (5,953,376), Forney (WO 98/32257) & Barabash et al. (5,640,417), as applied to claims 1, 9,10,12 & 13 above, and further in view of Maurer et al. (6,418,170).

32. Claim 14 is rejected under the same rationale as mentioned in the rejection of claim 9 above.

33. Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dagdeviren (6,798,851) in views of Wei (5,953,376) and Barabash et al. (5,640,417), as applied to claims 1-4 above, and further in view of Yeh (6,112,266).

34. Claim 15 is rejected under the same rationale as mentioned in the rejections of claims 2-5 above. It is also noted that Dagdeviren discloses steps of decoding the received signal by mapping them according to the constellation levels (see figure 6, col.11, lines 7-41) and in order to execute the steps the decoder of the receiving modem generates/manipulate received signal (claimed instructions for determination, identifications and interpolation between constellation points) (figure 6 & col.3, lines 33-46).

35. Claim 16 (in addition to aforementioned rejection of claim 15 above) is rejected under the same rationale as mentioned in the rejections of claims 5 & 6 above.

36. Claim 17 is rejected (in addition to aforementioned rejection of claim 15 above) is rejected under the same rationale as mentioned in the rejection of claim 1 above.

37. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dagdeviren (6,798,851) in views of Wei (5,953,376), Barabash et al. (5,640,417) & Yeh (6,112,266), as applied to claims 1-5 & 15-17 above, and further in view of Forney (WO 98/32257).

38. Claim 18 is rejected under the same rationale as mentioned in the rejection of claim 8 above.

39. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dagdeviren (6,798,851) in views of Wei (5,953,376), Barabash et al. (5,640,417), Yeh

(6,112,266) & Forney (WO 98/32257), as applied to claims 1-5 & 15-18 above, and further in view of Maurer et al. (6,418,170).

40. Claim 19 is rejected under the same rationale as mentioned in the rejection of claim 9 above. It is noted that in figures 2 & 3 Maurer is instructing the element 32 to decode equivalence class through trellis decoder 30 and reads on claim limitations of instructions for converting the sequence and decoding the equivalence class (col.4, lines 12-45).

***Conclusion***

41. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

***Contact Information***

42. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Naheed Ejaz whose telephone number is 571-272-5947. The examiner can normally be reached on Monday - Friday 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Naheed Ejaz
Examiner
Art Unit 2611

NE.
7/16/2007

CHIEH M. FAN
SUPERVISORY PATENT EXAMINER